Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

Plant Biosecurity

National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry

Growing Forward
A federal-provincial-territorial initiative

Canada

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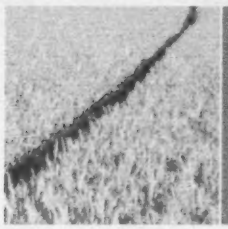

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Introduction

What is Biosecurity?

Biosecurity refers to a series of management practices designed to prevent, minimize, and control the introduction, spread, and release of plant pests, which include insects, nematodes, weeds, molluscs, bacteria, fungi, and viruses (hereafter referred to as pests).

Why Adopt or Implement Biosecurity Measures?

The grains and oilseeds industry consists of the twenty-one crops defined under the *Canada Grain Act* (barley, oats, rye, triticale, wheat, canola, flaxseed, mustard, rapeseed, safflower seed, solin, soyabeans, sunflower seed, beans, chick peas, fababeans, lentils, peas, mixed grain, buckwheat and corn), as well as unofficial grains (for example, canary seed, kamut, spelt and quinoa).

This industry is one of the largest in Canadian agriculture. It is in the interest of all farmers to protect their crops from such pests as khapra beetle, karnal bunt, dwarf bunt, soybean cyst nematode, clubroot, blackleg of canola, and woolly cup grass. Moreover, exports of grains and oilseeds from Canada in 2010-11 amounted to approximately $15.6 billion. In addition to the export market, the domestic industry that processes grains to produce such products as flour, vegetable oil, meal, ethanol, malt, and other value-added products adds appreciably to the Canadian economy. Processed grains and oilseeds product exports were $5.8 billion in 2010-11. Canadian grain production is also used for livestock feed.

Given the economic significance of this industry, the biosecurity measures needed to protect against the introduction and spread of pests are relevant not only to the grains and oilseeds' industry, but will indirectly affect other sectors of the economy such as tourism and the service sector.

From the farmer's perspective, there are several differing frames of reference when considering biosecurity risk management:

- What are my business objectives in maintaining markets and accessing new markets?
- What do my customers demand for biosecurity practices and protocols?
- How can I avoid the introduction of a biosecurity risk that I currently do not have?
- How can I contain and minimize the biosecurity risks that I already have?
- What are my responsibilities to my neighbours and industry to ensure that I am not the point of introduction of a biosecurity risk to someone else?

Purpose of a Biosecurity Standard?

This documented biosecurity voluntary standard provides the following:

- a methodical approach for the farmer to evaluate areas where the farm may be at risk (from pests); and
- a means to develop a farm-specific biosecurity plan, or the basis for developing management strategies to mitigate biosecurity risks.

The Standard is a "living" document that requires update and improvement as new science is available, as technology evolves, and as new biosecurity risks are identified, introduced, and understood.

Capacity to Manage Biosecurity Risks

Drifting of soil infested with pests, air-borne pathogens from neighbouring fields, field borders that are not maintained, and water erosion pose significant threats to grains and oilseeds' production. It is recognized that some vectors are more easily managed than others. Vectors such as wind, water, and wildlife can be difficult to control. However, the resulting risk of pest establishment and spread within the farm may be minimized by implementing biosecurity practices.

This farm-level biosecurity standard focuses specifically on farm-management practices within the control of the farmer at the production or farm-activity level.

Examples of management practices that can help mitigate biosecurity risk are:

- care in sourcing, transportation, and handling of input supplies;
- minimization of soil and plant material movement;
- monitoring the movement of people, vehicles, and equipment;
- cleaning of equipment;
- timely field scouting;
- beneficial crop production practices; and
- communication, training, and record keeping.

Development of the Biosecurity Standard for the Grains and Oilseeds Industry

In February 2011, the Canadian Food Inspection Agency (CFIA) in collaboration with Agriculture and Agri-Food Canada (AAFC) and the Canada Grains Council, identified and established a Grains and Oilseeds Biosecurity Advisory Group (including members of AAFC, Canadian Grain Commission, provincial governments, grains and oilseeds industry organizations and farmers) to guide the development of a National Voluntary Farm-Level Biosecurity Standard and the Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry.

The National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry identifies a series of desired outcomes in the pursuit of minimizing biosecurity risks for each farm and the broader agricultural community. A separate ***Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry: A Guide for Implementing Proactive Biosecurity into Farm Management***, has also been developed to provide a series of farm-management approaches that may be considered to achieve the desired outcome described in the Standard.

The development process has included:

- a literature review of relevant and related topics;
- a systematic gap analysis of existing farm-level programs to identify current knowledge and best practices;
- farmer consultation to identify current practices and best practices that have been adopted by grains and oilseed farmers from all regions of Canada; and
- ongoing feedback and input from the advisory group, CFIA, industry leaders, and subject area experts.

Requests for additional information and updates pertaining to the Standard and Guidance Documents should be directed to the CFIA.

Potential Vectors and Conditions, Risk Mitigation Tools

Table 1 provides an overview of the potential vectors of, and predisposing conditions for, biosecurity risks, key risk factors, possible risk mitigation measures or tools to consider, as well as reference to the targeted outcomes defined in the Standard. Biosecurity risks in grains and oilseeds can be categorized as soil-borne pests, diseases associated with plant material, weed seeds, and insects introduced to the farm and moved within the farm enterprise. Farm consultations suggest that there are farm activities and management considerations that may affect multiple biosecurity risks. This introductory table summarizes the various vectors that can potentially introduce risks to the farm and outlines some mitigation tools to manage those risks.

Table 1 is followed by a more detailed description of the Standard, organizing the targeted outcomes, risks, and risk mitigation tools by the management of the entry points to the farm, the movement within the farm enterprise, and the exit from the farm. General management processes are also described, which are not specific to entry, movement within, or exit from the farm.

TABLE 1: Overview of Biosecurity Risk Management in Grains and Oilseeds

Potential Vectors and Conditions	Key Risk Factor	Risk Mitigation Tools	Reference to Targeted Outcome Within the Standard
Seed	Introducing pests to the farm Moving pests within the farm	Assure seed quality and/or conduct testing	Introduction of biosecurity risk through input purchase or application (1.1.1)
Fertilizer	Introducing pests to the farm Moving pests within the farm	Primarily, require truck monitoring and cleanouts	Introduction of biosecurity risk through input purchase or application (1.1.2)
Soil	Introducing pests to the farm Moving pests within the farm	Restrict inter-field movement if not cleaned	Movement of farm equipment and people (2.2)
Manure, sludge, and bio-industrial waste	Introducing pests to the farm Moving pests within the farm	Assure content, and conduct adequate testing	Introduction of biosecurity risk through input purchase or application (1.1.3, 1.1.4)
Water	Introducing pests to the farm Moving pests within the farm	Utilize controlled water management measures	Introduction of biosecurity risk transmitted with water onto the farm (1.1.5, 2.1.5, 3.1.4)
People	Introducing pests to the farm Moving pests within the farm	Monitor and limit access or impose hygiene standard as required Monitor and advise as required Monitor and limit access, or impose hygiene standard as required	People on foot, via recreational vehicle or personal transport having access to the farm (1.4.1–1.4.5, 1.5.3) Movement of farm equipment and people (2.2.4) Movement of people off the farm (3.1.3)
Equipment	Introducing pests to the farm Moving pests within the farm	Restrict access if not cleaned	Introduction of biosecurity risk from agricultural equipment (1.2.1–1.2.3; 1.5.1, 1.5.2) Introduction of biosecurity risk from non-agricultural equipment (1.3.1–1.3.3)
		Restrict inter-field movement if not cleaned	Movement of farm equipment and people (2.2.1–2.2.3)
		Restrict movement off-farm if not cleaned	Equipment leaving farm if cleaned (3.1.2)

TABLE 1: Overview of Biosecurity Risk Management in Grains and Oilseeds *continued*

Potential Vectors and Conditions	Key Risk Factor	Risk Mitigation Tools	Reference to Targeted Outcome Within the Standard
Sludge and industrial waste	Presence of heavy metal and introduction to soil	Provide assurance of content, and conduct adequate testing	Introduction of biosecurity risk through input purchase or application (1.1.3, 1.1.4)
Storage	Lack of ideal crop condition; introduction of molds, toxins, insects	Carry out bin sampling, aeration, and handling	Crop condition (3.2)
Trucking and transport	Isolation and containment of known pests Unintentional commingling	Carry out containment and handling procedure, and cleanouts	Transport and handling equipment (1.2.1, 3.1.1)
Multiple vectors	Environment for pests	Consider crop selection and rotation Least susceptible varieties, adequate rotation intervals	Field susceptibility (2.1.1–2.1.4)
	Lack of early detection and containment	Carry out pest monitoring and management Timely, scouting, tracking and geo-referenced record keeping	Scouting, monitoring, assessment and decision-making (2.3)
	Lack of assurance that biosecurity management activities are understood and used consistently	Provide training, validation of compliance to the farm-specific biosecurity protocols, and documentation	Practices understood and followed by management and staff (4.1)
	Lack of external communication required to continually improve understanding and effectiveness of control measures	Facilitate communication and understanding	Effective external communications (4.2)

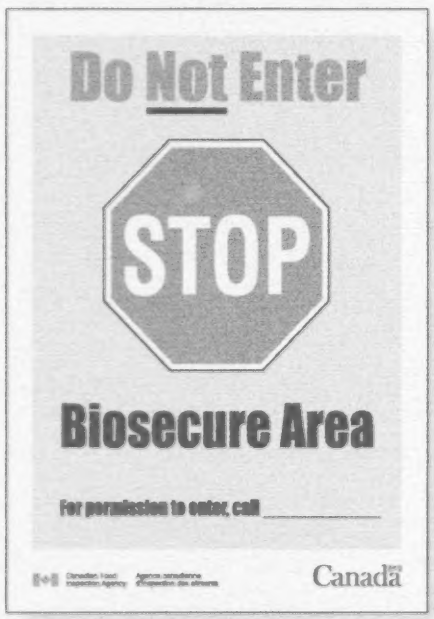
Categories for Potential Risk Introduction

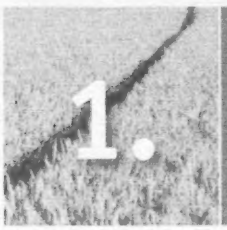
There are four categories involved in the presentation and discussion of potential pest introduction within the grains and oilseed industry:

1. Entry of pests to the farm
2. Movement of pests within the farm
3. Exit of pests from the farm
4. Management process

Within each category is a series of target outcomes and a description of the associated biosecurity risks for consideration. Many of the primary biosecurity risks are associated with the movement of soil (soil-borne pests such as clubroot, soybean cyst nematode, insect larvae, and weed seeds), and the movement of plant material (as an agent for transmission of disease, associated weed seeds, rhizome root fragments, and insects).

Each potential biosecurity risk requires assessment (identification, confirmation, and determination of its severity) and an appropriate plan or action response (risk mitigation tools or activities) by the farmer for the individual's own farm enterprise. Analytical tools and expertise are available for assessment, and a range of suggested management practices exist to address each biosecurity risk. Risk mitigation tools may include the following: product certification, monitoring and assessment of supply, assurance of known sources, testing, and other management procedures to minimize higher-risk input processes.





1. Entry of Pests to the Farm

Target Outcome 1.1: Crop inputs are sourced and managed to minimize or eliminate biosecurity risks.

Crop inputs have the potential to introduce soil-borne pests, diseases, weeds, insects, and heavy metals to the farm.

1.1.1 **Seed:** The purchase and delivery of seed onto the farm raises the potential for introducing pests. Seed that originates from production zones with pests not already present within the receiving region represents a potentially significant biosecurity risk. Although the purchase of certified seed provides an assured standard in purity, it is not necessarily 100% pure, and individual circumstances may require additional measures. There are also emerging concerns that soil adhering to seed may provide a vector for soil-borne pests to be transported from an infected area to an uninfected area. Additional precautions may be required, depending on crop selection and areas of seed origin.

1.1.2 **Fertilizer:** The purchase and delivery of fertilizer onto the farm creates the opportunity for pest (e.g. weed seed, volunteer crop seed) movement into unwanted areas. This risk is primarily a function of transportation and handling procedures that fail to keep out impurities in truck and equipment cleanouts. The material previously handled by truck or through elevation equipment affects that potential biosecurity risk.

1.1.3 **Manure/sludge:** Applying manure and/or sludge raises the potential for specific biosecurity risks. For manure, depending on the feed sources for the animals, a variety of pests can potentially survive digestion and be transported with the manure. The use of sludge can result in heavy metals and other toxins accumulating to levels that may affect future crop growth and/or quality. Both manure and sludge introduce the potential for pathogens with human health considerations.

1.1.4 **Industrial/bio-industrial waste:** There is an increasing number of industrial and bio-industrial processes that may be in search of cost-effective disposal and thus will look to farmland as a possible solution. Heavy metals and other possible contaminants may be introduced to the soil.

1.1.5 **Water:** Water can transmit pests. Surface water run-off creates the risk of introducing pests to farms.

Risk Mitigation Tools and Considerations

- Use clean seed. When using farm-saved seed, consider testing for germination, weed seed infestation, and disease identification. Purchase and utilize certified seed whenever possible; have a clear understanding of the origin and source of seed purchased and the level of pests contained within. Use seed treatments and coatings whenever weather and cropping conditions warrant. Ask for the laboratory report to determine what pests might be contained.
- Look for assurance of source, and inspection of product and cleaning trucks and/or railcars when sourcing and transporting fertilizer. Utilize suppliers and transporters known to implement a biosecurity risk management protocol.
- Understand the source of manure, and test for potential invasive weed species. Comply with existing local, municipal, provincial, and/or federal regulations pertaining to the application of manure to farmland.
- Undertake an independent evaluation of components of industrial/bio-industrial waste to identify any potential biosecurity risk this might represent. Refuse dumping of waste material if contaminants are being introduced to the soil.
- Monitor and improve field drainage. Utilize controlled water management measures, such as grass-covered waterways and planned field drainage to improve water movement in a non-damaging manner.

Target Outcome 1.2: Minimize or eliminate the biosecurity risks introduced with farm equipment access to the farm.

Equipment entering the farm brings the risk of introducing pests to the farm.

1.2.1 **Trucks and transport equipment delivering inputs:** The delivery vehicle itself brings the potential for movement of soil and/or plant material (including weed seeds, pathogens, nematodes, insects) falling from the chassis, tires, or undercarriage. The biosecurity risk is dependent upon the previous locations from which the equipment has travelled and on the extent to which it has been cleaned.

1.2.2 **Farm equipment:** Any piece of agricultural equipment arriving at the farm brings with it the risk of soil- or plant-material movement that can effectively be the source of a new infestation. Soil-borne pests are of particular concern.

1.2.3 **Custom field operations:** As with purchased or rented equipment, soil or plant material moved on custom equipment can be the source of new soil-borne pests and weed infestations if not cleaned. Custom combiners, known for travelling significant distances, can be an ideal vector for the movement of such pests as weed seeds.

Risk Mitigation Tools and Considerations

- Consider dealing exclusively with suppliers and operators who are known to follow a cleaning-equipment protocol before leaving the area in which they last worked.
- Minimize the movement of equipment over wet soil to avoid excessive movement of soil.
- Locate washing facilities for cleaning and disinfecting equipment in an area that prevents pest introduction and spread. Consider the capacity for water supply and waste water collection and disposal.
- Designate appropriately located receiving areas for inspection (cleaning and treatment, if necessary) of farm crop inputs and/or equipment.

Target Outcome 1.3: Minimize or eliminate the biosecurity risks introduced by the access of non-agricultural equipment to the farm.

Equipment access not directly related to agricultural activity also presents a risk of introducing a pest.

1.3.1 **Pipeline and oil/gas well development:** The activities of pipeline or other soil-movement activities may pose a significant risk of moving pests to the farm (via soil and plant debris).

1.3.2 **Utilities (electricity, gas, water):** Similar to pipeline activity, any potential movement of soil from an infected area to a non-infected area should be managed. This soil movement could be from actual digging equipment (trencher) or even muddy trucks.

1.3.3 **Other equipment:** Consider as a potential biosecurity risk any construction or renovation of provincial or municipal waterways, digging activity, the erection of signs or a wide range of activities that create the potential for movement of soil or plant debris.

Risk Mitigation Tools and Considerations

- Seek assurance that equipment operators follow a protocol of cleaning equipment before leaving the area from which they have last worked.
- Develop an understanding of the risk profile for the area in which the equipment was previously working, and the assurance of cleaning prior to arrival.
- Consider including equipment-cleaning requirements and defined levels of cleanliness in land-access agreements.

Target Outcome 1.4: Minimize or eliminate the biosecurity risks introduced by people having access to the farm.

Individuals who travel on foot, via recreational vehicle or personal transport may introduce a pest to the farm.

1.4.1 **Guests:** Anyone who arrives at a farm from another area may inadvertently introduce soil or plant material carrying pests that could potentially be introduced to the new area.

1.4.2 **Off-road vehicle operators:** These people have the potential to redistribute soil or plant material carrying pests from one location to another. For recreational activities, enthusiasts may intentionally look for mud in which to operate, and then truck or trailer the off-road vehicle to multiple locations without cleaning off.

1.4.3 **Neighbours:** The arrival of neighbours on fields or in yards, by foot or by vehicle, may pose some biosecurity risk depending on where they have travelled recently and whether they have pests that are not presently apparent. Ordinarily, it is assumed that neighbours have the same issues and pose little risk. That may not always be true.

1.4.4 **Tradespeople, suppliers, and agronomists:** By the nature of their business, these people travel between multiple locations within a short time frame and present the risk of introducing and moving pests through soil and plant material.

1.4.5 **Hunters and/or eco-tourists:** In many areas, farmland is considered ideal territory for hunters, horseback riders, or recreational hikers. They may inadvertently carry pests through soil and plant material, which could potentially be introduced to the farm.

Risk Mitigation Tools and Considerations

- Encourage proper sanitation procedures.
- Understand who is travelling on the land and be certain that people understand the risk factors that their access may present. Those risks will be highly dependent on where they may have previously travelled and the degree to which they have de-contaminated themselves and/or the vehicle in/on which they are travelling.
- Locate visitor and farm personnel parking away from production areas, and separate from farm equipment and vehicles.
- Consider defining protocols and/or guidelines for agronomists and other suppliers to protect the farm from the potential introduction of pests from soil- or plant-material movement. Although the ability to control access may be limited, in those cases where access management is possible, guidelines are required.
- Consider using a visitor and service personnel log.

Target Outcome 1.5: Minimize or eliminate the biosecurity risks introduced by farm employees and/or management.

Farm managers and/or farm employees may be the vector of biosecurity risks from other farms back to the home farm.

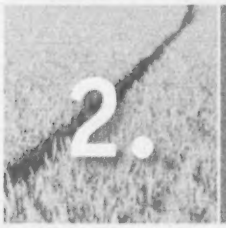
1.5.1 **With farm equipment:** If farm equipment is used in other locations (rented, borrowed, or custom operations) and then returned to the original farm, there is potential for pests, through soil and plant material, to spread from one location to another.

1.5.2 **By vehicle:** Travel by vehicle from one farm location back to another location presents the risk of pest movement through soil and plant material.

1.5.3 **By foot:** Under certain circumstances, foot traffic from one field to another can be the source of transmitting pests through soil and plant material.

Risk Mitigation Tools and Considerations

- Assess the impact of traffic flow (people and vehicles) and equipment onto the farm.
- Consider developing farm-specific procedures for assessing the risk of travelling to other areas and the appropriate cleaning protocol and procedures on their return.



2. Movement of Pests within the Farm

Target Outcome 2.1: Crop selection, and field susceptibility to a specific crop or variety, are to be managed to reduce the propagation and transmission of pests.

Increased susceptibility of crops to losses because of pests and the emergence of more aggressive or resistant strains of pests (e.g. weed resistance) can be reduced by crop rotation, variety selection, field management, and crop-protection product selection.

2.1.1 **Rotation:** Crop rotation serves as a means of breaking the cycle of development for a number of familiar and possibly unfamiliar potential diseases. Shortening the rotation between crops and/or similar crop groupings increases the risk of disease development. If those diseases are also easily spread to adjacent fields, the risk of a short rotation is not only borne by the individual farmer but potentially by neighbouring farmers and the surrounding region.

2.1.2 **Variety:** Different varieties can have varying levels of susceptibility to the development of diseases. Selecting resistant varieties serves as a means of minimizing and/or delaying the potential for disease and/or pest development.

2.1.3 **Field residue management:** The handling of field residue from previous crops can affect the development of diseases in subsequent crops. A uniform distribution of field residue is generally preferred. The option of incorporating residue would need to be weighed against the water retention and other agronomic advantages of low disturbance management.

2.1.4 **Herbicide, fungicide, insecticide resistance:** Rotation of chemistry groups and using products with multiple chemistries and/or modes of action significantly reduce the potential for the development of pest resistance. Herbicide residues can affect reseeding plans and future seeding intentions.

2.1.5 **Water:** Water can transmit pests. Surface water run-off creates risk of pest movement within farms.

Risk Mitigation Tools and Considerations

- Follow industry best practices that have been established for managing crop rotation, variety selection, and crop management. In circumstances of higher potential risk, even greater precautions may need to be considered.
- Use pest-resistant varieties where possible.
- Read and follow label instructions on seed and chemical use.
- Maintain good field records, including pesticide residues that could affect future seeding plans and potential long-term pesticide resistance.
- Monitor and improve field drainage. Utilize controlled water management measures, such as grass-covered waterways and planned field drainage to improve water movement in a non-damaging manner.

Target Outcome 2.2: Minimize or eliminate the movement and multiplication of pests through the movement of farm equipment and people within the farm.

Pests can be unnecessarily moved or spread within the farm from a confined area to affect other areas of the farm by a variety of vectors.

2.2.1 **Tillage equipment:** Movement of soil or plant material from one area of the farm to another presents the biosecurity risk of exposing the entire farm to a pest that may otherwise have been isolated to a small area.

2.2.2 **Soil movement in tires/tracks:** The movement of soil and/or plant material in tires and tracks of farm machinery may unnecessarily spread pests throughout the farm.

2.2.3 **Harvest equipment:** Harvest equipment poses a specific risk of moving soil and plant material from one area of the farm to another.

2.2.4 **People movement within the farm:** Under certain conditions, even the movement of people from one area of the farm to another can redistribute a pest problem. For some highly susceptible crops, this may include soil movement from muddy feet. It may also include the movement of disease from one wet crop canopy to another via wet pant legs.

Risk Mitigation Tools and Considerations

- Consider cleaning of equipment between an area of a known or potential risk and other areas of the farm. Thorough cleaning of equipment between fields may be justified.
- Strategically sequence field activities to minimize the number of cleanouts that may be required.
- Consider appropriate clean-out and clean-off practices for harvest equipment when moving from one field to another, particularly if a known isolated pest is identified.
- For farms with multiple units of seeding and tillage equipment, and/or combines, assign only one piece of equipment to an infected area to minimize the risk of transmission and to reduce the number of cleanouts required.
- Avoid having people move from higher-risk locations to other farm locations without considering cleaning their boots and clothing.

Target Outcome 2.3: Minimize or eliminate the spread of pests throughout the farm by timely scouting, monitoring, assessment and decision-making.

Biosecurity risks that are present, but not clearly identified and understood, cannot be effectively contained from moving within the farm.

2.3.1 **Scouting and monitoring:** An important part of minimizing the spread of pests is early detection and clear identification of the problem.

2.3.2 **Economic thresholds (short and long term):** As pests are identified, the full economic and agronomic implications of controlling or not controlling the problem within the window of opportunity for control need to be assessed. There can be both short- and long-term implications of control options to consider, relative to the intensity of the infestation. Under some circumstances, control measures can remove beneficial insects and natural competitive pathogens.

2.3.3 **Information network (learning from and alerting others):** A strong information network provides for quick access to resources for assessing new problems, obtaining information regarding economic thresholds, and alerting others about potential risks within the region.

Risk Mitigation Tools and Considerations

- In severe circumstances, consider alternative cropping strategies to minimize the distribution of pests.
- Consider using a consistent field-monitoring program as the basis for developing an appropriate containment management strategy. Timely field scouting and evaluation (before and after control practices have been used) are critical steps to effective biosecurity management.
- Implement a pest-scouting program for shelterbelts, riparian land along rivers and streams, and fence lines.
- Maintain accurate and routine scouting reports, noting the presence or absence of pests or other crop health issues.
- Implement good record keeping; it is essential. Ensure records are adequately geo-referenced to their specific location, ideally electronically.
- Utilize the multiple data sources that are available for gathering information on current and emerging biosecurity risks.
- Consult professional agronomists or other professionals, as required.
- Conduct a full assessment of the history and previous use of newly acquired or leased land.
- Keep farm management and staff up to date on the latest information concerning pest alerts in their area.
- Investigate suspected problems to identify pests and implement appropriate management practices. Report any unusual finding to appropriate industry experts.

3. Exit of Pests from the Farm

Target Outcome 3.1: Minimize the spread of pests by ensuring the inspection and appropriate sanitation of any transport and/or field equipment leaving the farm.

Movement of equipment and people from the farm can be the source or vector of biosecurity risk to other farms.

3.1.1 **Trucking:** Trucks that have been in the field or in the yard may have picked up soil or plant material and thus potentially carry pests to the next destination.

3.1.2 **Field equipment:** Field equipment leaving the farm for any reason presents the risk of moving soil or plant material that could introduce a new pest to the destination site.

3.1.3 **Personnel:** People who move off-farm can pose the same risk to other farms as those who travel onto their own property.

3.1.4 **Water:** Water can transmit pests. Surface water run-off creates a risk of moving pests off farms.

Risk Mitigation Tools and Considerations

- Consider risk mitigation measures for all equipment and people leaving the farm location. The same concerns and considerations given to biosecurity risk entering the farm should be considered and respected as a potential risk to other farms.
- Monitor and improve field drainage. Utilize controlled water management measures, such as grass-covered waterways and planned field drainage to improve water movement in a non-damaging manner.

Target Outcome 3.2: Minimize or eliminate the introduction of biosecurity risks to another farm or area, due to crop transfer, sale, or storage.

Grain handling, storage, and condition can influence the potential for transmitting pests and/or mold/toxin to another location.

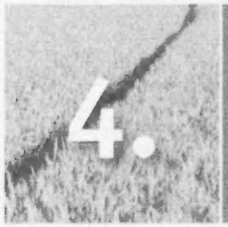
3.2.1 **Bin monitoring and sampling:** Timely post-harvest sampling of bins and/or grain bags for temperature, moisture content, condition, and other quality parameters can substantially reduce biosecurity risk and potential economic loss. Adequate handling, drying, and/or aeration can improve, or at least stabilize, grain that is not in ideal storage condition.

3.2.2 **Storage waste material and off-specification product:** Removal, handling, and disposal of unmarketable product and screenings are necessary to minimize the potential distribution of pests.

3.2.3 **Full understanding and disclosure to buyers:** Good sampling and testing, as required, can ensure that you have the complete story of the grain condition in order to fully disclose and/or manage any potential risks with buyers and/or other members of the value chain, especially from farm to farm.

Risk Mitigation Tools and Considerations

- Clean storage facilities to eliminate pest development.
- Ensure storage facilities are maintained free from vermin and with no access to the stored grain by wildlife.
- Inspect and monitor stored grain regularly for condition and quality.
- Utilize adequate aeration, when available, to maintain crop condition.
- Implement storage management techniques such as drying, turning the crop, or moving the grain to minimize pest (e.g. insect) propagation.
- Retain and test representative grain samples to reduce the likelihood of transmitting a biosecurity problem off of the farm. Supplement the testing protocol with ad hoc sampling where the pests are most likely to be present (e.g. testing for insects in the higher core portion of the stored grain mass).
- Dispose of waste material and unmarketable product appropriately.
- Responsibly represent marketable product.



4. Management Process

Target Outcome 4.1: Biosecurity management practices are developed and documented, and understood and implemented by all management and staff.

Knowing what to do, making sure it gets done, and documenting the activities with adequate records to prove that it was done are required for effective biosecurity management.

4.1.1 **Documented farm-specific biosecurity risk management plan:** Extensive guidelines, best agronomic practices, and beneficial management practices exist within such organizations as commodity groups, commercial suppliers, and the Canadian Grain Commission to access information when creating a farm plan.

4.1.2 **Training plan:** Farm management and staff need to identify biosecurity risk and implement a risk management protocol to minimize the risk.

4.1.3 **Record keeping:** Potential risks should be documented for future reference. Monitor risk management implementation by documenting and verifying that such practices were put in place.

4.1.4 **Communication:** Management and staff need to understand potential introducers of risks, and the risk mitigation tools that are available, when developing and implementing a farm-specific biosecurity risk management plan.

Risk Mitigation Tools and Considerations

- Document and implement a sound biosecurity management plan for your farm, providing a clear description of intended practices to ensure that the biosecurity risks most likely to become an issue on-farm have an identified management strategy.
- Develop and implement a method of training to ensure all appropriate farm employees and decision makers are aware of the major issues, are familiar with the chosen best management practices, and are committed to following those practices.
- Integrate biosecurity risk management considerations within farm management processes. Use the range of prospective management tools that are available, ensuring best practices are understood and followed by farm staff and management.
- Consider mapping the farm property, including such parameters as field history, physical location, topography, to assist in managing biosecurity risk.
- Ensure that suspected problems are investigated immediately to identify the potential pests, and that appropriate management practices are implemented to identify, control, contain, and/or resolve the outbreak.
- Maintain emergency contact information if any biosecurity risk or event should occur. These contacts may include professional agronomists, and provincial or municipal specialists.
- Develop a procedure for reporting pests and other biosecurity risks to the appropriate plant health authority and specialist.
- Communicate the biosecurity management plan to all management and staff.

Target Outcome 4.2: Minimize or eliminate the introduction, spread, and/or transfer of biosecurity risks through active external communication.

Clear communication with suppliers, neighbours, and others is important to ensure that the procedures that are required to protect an individual farm, and other farms, are understood and followed.

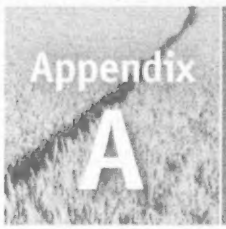
4.2.1 **Communication:** Clear messaging to all appropriate external suppliers, farming colleagues, researchers, local governments, working partners, and visitors will assist in establishing clear expectations and realistic working relationships that minimize the potential for biosecurity risk introduction and spread.

Risk Mitigation Tools and Considerations

- Communicate the possible on-farm risks, particularly as they relate to the prospective movement of equipment and soil.
- Consider farm zoning, using geo-referenced records, identifying farm-specific low-to-higher biosecurity risk areas.
- Consider documenting farm-specific biosecurity policies and procedures in a way that allows for external sharing.
- Have a copy of the biosecurity plan available for suppliers, farming colleagues, researchers, local governments, working partners, and visitors, as requested.
- Maintain a visible record of cleaning and disinfection practices.
- If necessary, specifically reference biosecurity requirements in the development and negotiation of supply agreements and/or employee labour agreements.
- Consult professional agronomists or other professionals, as required.
- Stay aware of local meeting topics or press/web releases, especially in regard to pest presence and spread.
- Use signage to caution and inform farm visitors about the potential of introducing to the farm, moving within the farm, and exiting from the farm, of pests that may present a biosecurity risk.

Appendix A provides a summary tool to assist in biosecurity risk management on your farm. It is designed for a rapid review or an "at a glance" assessment of where your farm may be exposed to varying levels of biosecurity risk.

It is expected that, as questions arise from this checklist regarding your own farm, that this ***National Voluntary Farm-Level Biosecurity Standard Document*** and the accompanying ***Producer Guide*** will provide additional information and management options for your consideration.



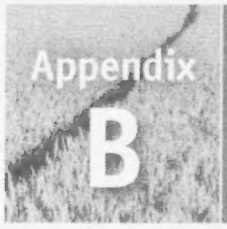
Self-Assessment Tool to Determine the Need for a Biosecurity Management Plan

1. Can I avoid the introduction of a biosecurity risk that I currently do not have?	Yes ☐	No ☐
Crop inputs such as seed, fertilizer, manure, waste, and water brought onto the farm are assessed for their potential to introduce pests.	☐	☐
Delivery vehicles, farm implements, and/or equipment that enter the farm are assessed for their potential to introduce pests.	☐	☐
Soil movement is minimized. Non-agricultural equipment entering the farm is assessed for the potential to introduce pests.	☐	☐
Visitors, guests, tradespeople, agronomists, and suppliers who travel by vehicle or by foot are assessed for their potential to introduce pests.	☐	☐
Farm vehicles, implements, or people that leave the farm and return home are assessed to determine the potential introduction of pests.	☐	☐

2. Can I contain and minimize the biosecurity risks that I already have?	Yes ☐	No ☐
Alternative cropping strategies, crop rotation, crop and variety selection, and field history are recognized as potential management tools to minimize the spread of pests.	☐	☐
Soil movement is minimized. Moving equipment and people within the farm, viewed as potential carriers of pest problems, is managed in a practical and effective manner.	☐	☐
Timely scouting and monitoring, along with a clear understanding of economic thresholds and implications of control measures, are used in decision making.	☐	☐
There is a water management strategy for my farm. Appropriate drainage exists to minimize the movement of pests.	☐	☐
Intended management practices are documented, and all farm employees and decision makers are aware, informed, and committed.	☐	☐
Intended management practices are documented, and all external service providers and production partners are aware, informed, and committed.	☐	☐

3. Can I avoid pests leaving my farm?	Yes	No
	☐	☐
Trucks and/or farm equipment leaving the farm are assessed for their potential to spread a pest from the farm to other farms or areas.	☐	☐
Appropriate signage exists.	☐	☐
Bins and handling equipment are inspected and cleaned before their use, and grain condition is monitored.	☐	☐
Water exiting my farm is managed to reduce the potential to spread pests.	☐	☐
Unmarketable product and screenings are managed to minimize the risk of pests leaving the farm.	☐	☐

4. Do I need a biosecurity risk management plan for my farm?	Yes	No
	☐	☐
Will a biosecurity management plan help support my business objectives in maintaining markets and accessing new markets?	☐	☐
Do my customers demand biosecurity practices and protocols? Will this be increasing in the future?	☐	☐
Do I have a responsibility to my neighbours and my industry to ensure that I am not the point of introduction of a biosecurity risk to others?	☐	☐
Do my management and staff know and understand pest management techniques?	☐	☐
Do I make it known to my suppliers, farming colleagues, researchers, local governments, working partners, and visitors that we need to manage pests?	☐	☐
Would I, my management, and/or my staff know what to do if a significant pest issue became evident on my farm?	☐	☐



Glossary

Biosecurity: A series of management practices designed to prevent, minimize, and control:
- the introduction of pests into a production area or farm;
- the spread of pests within a production area or farm; and
- the movement of pests off the production area or farm.

Biosecurity Plan: A written plan that includes protocols of uniquely designed practices to prevent, minimize, control, and contain pest movement onto, and spread within, and off a farm.

Commercial/custom applicators: Contractors who are hired to apply pesticides, including fungicides, herbicides, lime, etc., using their own equipment.

Disease: An impairment of the normal state of the plant, caused by a pathogen, such as bacteria, fungi, nematode, or virus.

Farm: A tract(s) of land (commonly referred to as a farm unit) used for the purposes of crop production. The farm includes residences and all farm storages, buildings, and structures, as well as fields (remotely located) used for the production of a crop.

Farm equipment: Tractors, farm machinery, and implements, excluding vehicles.

Farm vehicles: Farm vehicles such as trucks, pickups, and all terrain vehicles either used on the farm or used to deliver grains and oilseeds to the market.

Farmer/producer: One who owns or rents land for crop production, produces the crop, markets the crop; and manages the assets to produce and market the crop, and the business of a farm enterprise.

Field: An area designated for the production of crops.

Guests: Any non-farm personnel who arrives at the farm (includes salespersons, inspectors, delivery people, contractors, friends/relatives of farm personnel, etc.).

Guidance document: A compilation of examples of beneficial practices to facilitate the implementation of the *National Farm-Level Biosecurity Standard*.

Management process: Some assurance that what is identified as important is integrated into a management system to ensure it gets done.

Non-agricultural vehicles: Vehicles used by various service providers who visit the farm to provide a specific service, such as electrician, plumber, heating specialist, etc.

Non-agricultural equipment: Equipment used by various industries that may visit the farm to gain access for pipeline or oil site, or for such industrial developments and uses.

Off-road vehicles: All-terrain vehicles, quads, dirt bikes, and snowmobiles.

Pathogen: An agent that causes disease, especially a living microorganism such as a bacterium, fungus, nematode, or virus.

Pest: According to the *Plant Protection Act, Government of Canada*, any thing that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest. ("Thing" includes a plant and a pest; "plant" includes a part of a plant).

Pest monitoring plan: A written protocol that is routinely followed to monitor crops for the presence of pests.

Practice: A procedure(s) that is followed by the operator(s), without necessarily being written or detailed to the extent of a protocol.

Production area: A field designated for cultivation of crops.

Property: The land on which the production area(s) are located, including the residence and all farm buildings/structures.

Protocol: Defined and written procedures, which detail the steps to be followed to achieve an objective such as disinfecting a piece of farm equipment.

Quarantine pest: A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (International Standard for Phytosanitary Measures [ISPM] No. 5).

Regulated pest: A quarantine pest or a regulated non-quarantine pest (ISPM No. 5).

Regulated non-quarantine pest: A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of importing contracted party (ISPM No. 5).

Representative grain sample: Grains and oilseed grades are based on samples. To ensure samples adequately reflect the entire lot of grain, proper sampling procedures must be used. These procedures are outlined by the Canadian Grain Commission.

Rotation: Alternating types of crop production in a field from year to year to help mitigate pests within the crop.

Scouting: Monitoring of field crop conditions during the growing season by qualified experts.

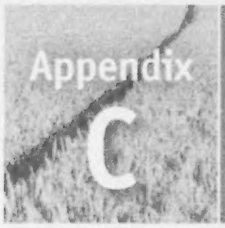
Seed: Grains and oilseeds recognized as meeting the requirements defined in the *Seeds Act* and *Regulations of the Government of Canada*.

Target outcome: A goal that all farmers/producers, regardless of the size of their operation, should try to implement to protect their farm and crops from the introduction and spread of pests.

Vector: A carrier, or an agent, capable of transmitting a pest from an infected source to a host.

Volunteer crop: Self-set plants from previous years' crop that may become established as weeds in the current crop.

An accompanying *Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry: A Guide for Implementing Proactive Biosecurity into Farm Management*, is available to provide farmers with specific management options to consider in meeting each of the targeted outcome objectives.



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